

STTH200R04TV

Ultrafast recovery diode

Main product characteristics

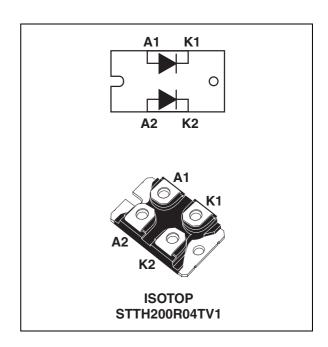
I _{F(AV)}	2 x 100 A
V _{RRM}	400 V
Tj	150° C
V _{F (typ)}	0.87 V
t _{rr (typ)}	40 ns

Features and benefits

- Ultrafast
- Very low switching losses
- High frequency and high pulsed current operation
- Low leakage current
- Insulated package:
 - ISOTOP
 Electrical insulation = 2500 V_{RMS}
 Capacitance = 45 pF

Description

The STTH200R04TV series uses ST's new 400 V planar Pt doping technology. The STTH200R04 is specially suited for switching mode base drive and transistor circuits, such as welding equipment.



Order codes

Part Number	Marking
STTH200R04TV1	STTH200R04TV1

Characteristics STTH200R04TV

1 Characteristics

Table 1. Absolute ratings (limiting values per diode at 25° C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage	Repetitive peak reverse voltage			V
V _{RSM}	Non repetitive peak reverse voltage			400	V
I _{F(RMS)}	RMS forward current Per diode		150	Α	
1	Average forward current, $\delta = 0.5$	Per diode	T _c = 80° C	100	Α
I _{F(AV)}	Average lorward current, $\theta = 0.5$	Per package	T _c = 65° C	200	Α
I _{FRM}	Repetitive peak forward current $t_p = 5 \mu s$, $F = 1 kHz square$		2000	Α	
I _{FSM}	Surge non repetitive forward current t _p = 10 ms Sinusoidal		1000	Α	
T _{stg}	Storage temperature range			-65 to + 150	°C
Tj	Maximum operating junction temperature			150	°C

Table 2. Thermal parameters

Symbol	Parameter		Value	Unit
D	Junction to case	Per diode	0.50	
R _{th(j-c)}	Total	0.30	° C/W	
R _{th(c)}	Coupling thermal resistance		0.1	

When the diodes are used simultaneously: $\Delta T_{j(diode1)} = P_{(diode1)} \ x \ R_{th(j\text{-}c)} \ (\text{per diode}) + P_{(diode2)} \ x \ R_{th(c)}$

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур	Max.	Unit
I _B ⁽¹⁾	Reverse leakage current	T _j = 25° C	V - V			80	
'R`	neverse leakage current	$T_j = 125^{\circ} C$ $V_R = V_{RRM}$		80	800	μA	
		T _j = 25° C				1.35	
V _F ⁽²⁾	Forward voltage drop	T _j = 100° C	I _F = 100 A		0.95	1.2	V
		T _j = 150° C			0.87	1.1	

^{1.} Pulse test: $t_p = 5$ ms, $\delta < 2$ %

2/7

To evaluate the conduction losses use the following equation:

$$P = 0.8 \times I_{F(AV)} + 0.003 \times I_{F}^{2}(RMS)$$

^{2.} Pulse test: $t_{\rm p}$ = 380 μ s, δ < 2 %

STTH200R04TV Characteristics

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Тур	Max.	Unit
		$I_F = 1 \text{ A, } dI_F/dt = -50 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25^{\circ} \text{ C}$			100	
t _{rr}	Reverse recovery time	$I_F = 1 \text{ A, } dI_F/dt = -100 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25^{\circ} \text{ C}$		50	70	ns
		$I_F = 1 \text{ A, } dI_F/dt = -200 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25^{\circ} \text{ C}$		40	55	
I _{RM}	Reverse recovery current	$I_F = 100 \text{ A}, dI_F/dt = -200 \text{ A/}\mu\text{s},$ $V_R = 320 \text{ V}, T_j = 125^{\circ} \text{ C}$		22	32	Α
Q _{RR}	Reverse recovery charges	$I_F = 100 \text{ A}, dI_F/dt = -200 \text{ A/}\mu\text{s},$ $V_R = 320 \text{ V}, T_j = 125^{\circ} \text{ C}$		1500	2900	nC
S	Softness factor	$I_F = 100 \text{ A}, dI_F/dt = -200 \text{ A/}\mu\text{s},$ $V_R = 320 \text{ V}, T_j = 125^{\circ} \text{ C}$		0.4		
t _{fr}	Forward recovery time	$I_F = 100 \text{ A}$ $dI_F/dt = 100 \text{ A/µs}$ $V_{FR} = 1.5 \text{ x } V_{Fmax}, T_j = 25^{\circ} \text{ C}$		1000		ns
V _{FP}	Forward recovery voltage	$I_F = 100 \text{ A}, dI_F/dt = 100 \text{ A/}\mu\text{s},$ $T_j = 25^{\circ} \text{ C}$		3.5		V

Figure 1. Conduction losses versus average current

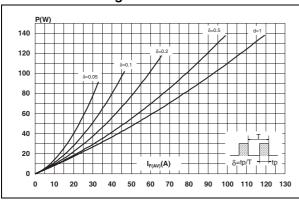


Figure 2. Forward voltage drop versus forward current

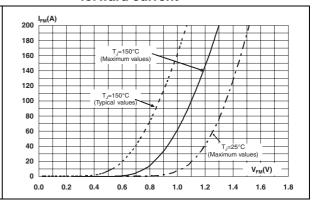
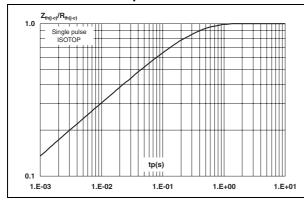
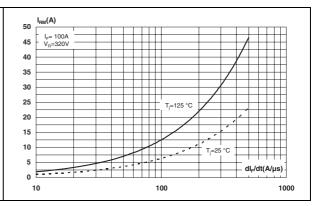


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

Figure 4. Peak reverse recovery current versus dl_F/dt (typical values)

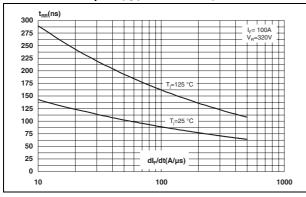




Characteristics STTH200R04TV

Figure 5. Reverse recovery time versus dl_F/dt (typical values)

Figure 6. Reverse recovery charges versus dl_F/dt (typical values)



t_{FR}(ns)

4500

4500

4500

4000

3500

3500

3000

2500

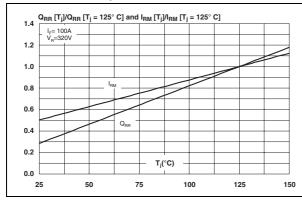
2000

1500

0 100 200 300 400 500

Figure 7. Relative variations of dynamic parameters versus junction temperature

Figure 8. Transient peak forward voltage versus dl_F/dt (typical values)



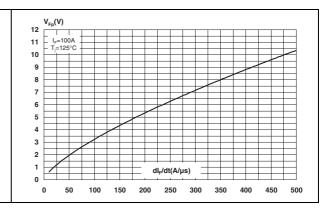
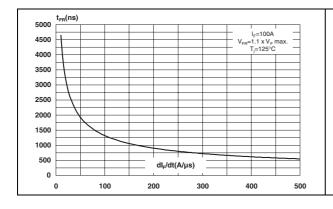
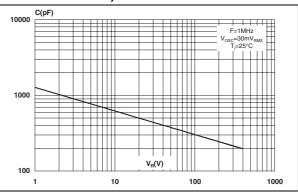


Figure 9. Forward recovery time versus dI_F/dt Figure 10. (typical values)

Junction capacitance versus reverse voltage applied (typical values)





4/7

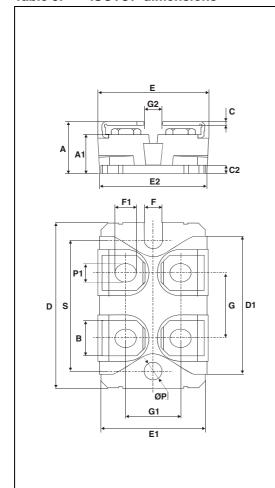
STTH200R04TV Package information

2 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)

Table 5. ISOTOP dimensions



	Dimensions				
Ref.	Millim	neters	Inc	hes	
	Min.	Max.	Min.	Max.	
Α	11.80	12.20	0.465	0.480	
A1	8.90	9.10	0.350	0.358	
В	7.8	8.20	0.307	0.323	
С	0.75	0.85	0.030	0.033	
C2	1.95	2.05	0.077	0.081	
D	37.80	38.20	1.488	1.504	
D1	31.50	31.70	1.240	1.248	
Е	25.15	25.50	0.990	1.004	
E1	23.85	24.15	0.939	0.951	
E2	24.80) typ.	0.976 typ.		
G	14.90	15.10	0.587	0.594	
G1	12.60	12.80	0.496	0.504	
G2	3.50	4.30	0.138	0.169	
F	4.10	4.30	0.161	0.169	
F1	4.60	5.00	0.181	0.197	
Р	4.00	4.30	0.157	0.69	
P1	4.00	4.40	0.157	0.173	
S	30.10	30.30	1.185	1.193	

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

577

Ordering information STTH200R04TV

3 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH200R04TV1	STTH200R04TV1	ISOTOP	27 g	10	Tube

4 Revision history

Date	Revision	Description of Changes
31-Mar-2007	1	First issue

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2007 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

